

# Thesis/ Scientific Methods and Writing

## Part III

Prof. Dr. M.-L. Klotz

**Please study my recommendations; first, before you start!**

You have chosen a topic, you have done some literature research?

**Now please, develop and write the chapters Abstract, Problem, Objectives, Introduction and Summary and send them to me! All chapters should be at least a half page each, except the Introduction with at least two pages.**

**Please,  
in addition give the list of references, the list of abbreviations, list of figures and the list of tables in separate chapters (this will only be copy and paste, if you have worked out everything in the right manner).**

**Do not hesitate to contact me if there are questions! Your questions help me to learn how is your understanding and your experience with the technical terms of writing. Thank you!**

# Language and Content

Writing scientific documents is difficult, no doubt!

Word choices, sentence rhythms and paper organization will be important.

**Scientific writing must be done straightforward**

Scientific writing has two goals:

To inform the reader and to persuade the reader according to your research achievements.

- Purpose of writing to inform: use a style that communicates the most amount of information in the least amount of reading time.
- Purpose of writing to persuade: use a style that presents logical arguments in the most convincing manner.
- Scientific writing is hard work.
- You have to struggle for every paragraph, every sentence, every phrase.
- Write, rewrite and rewrite again until it is ...

## Some rules and recommendations (I):

- The language you choose will depend on the subject, on the purpose. A newspaper article has to be written in a different style compared to a paper for a scientific journal. Check the style other authors have used before. –
- An engineer will use another language than a Science Communication expert, a designer or a business expert. So there are no rules existing. Think about the audience, what language do they understand. Where is their background? Their interest? – Besides, your supervisor might have some preferences. Find these out!

## Some rules and recommendations (II):

- Even culture will influence the type of language.
- But anyway, choose a language according to the reader, the audience!
- Use short sentences, take care of grammar and punctuation!
- The layout is important and will support the audience reading your paper, your thesis!

## Some rules and recommendations (III):

- No abbreviations without explanation!

For instance, like .....Powerpoint presentation (PPP) .....when the expression, you prefer to abbreviate next time, is mentioned for the first time, give the abbreviation of the complete written expression in brackets like in the above shown example. In addition you have to list all abbreviations in your chapter with the headline „List of Abbreviations“ or „Glossary“ in alphabetic order!

## **Layout: What is easier to read? Compare! This slide? Or others with the same text? Support the reader's motivation and understanding!**

The language you choose will depend on the subject, on the purpose. A newspaper article has to be written in a different style compared to a paper for a scientific journal. Check the style other authors have used before.

An engineer will use another language than a Science Communication expert, a designer or a business expert. So there are no rules existing. Think about the audience, what language do they understand. Where is their background? Their interest? – Besides, your supervisor might have some preferences. Find these out! No abbreviations without explanation!

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!

**Do you agree? This layout is not convenient!**



# How to use and write compounds?

- Christmas holidays or or christmas-holidays?

Cross section or cross-section?

There do not exist rules. But the trend is away from hyphens.

- Should you use „I“ or „we“ when you describe your scientific ideas, experiments, results, discussion and so on?

Using „I“ will help you to avoid the use of passive voice so often. But keep in mind that some editors or supervisors will forbid you its use in scientific writing. Check it in advance!

# Thesis: Organization of the Chapters (I)

First page

Title

Bachelor / Master Thesis

of

Name of the Candidate

( full name, registration number, city/country where you are from,

Study programme,

Faculty of Technology and Bionics,

Rhine-Waal University of Applied Sciences

Name of your

First and second Supervisor

SS /WS, when you pass the thesis to the examination office

## Thesis:      Organization of the Chapters (II)

Second page

**Thanks/Acknowledgement - short!**

Maybe: the company you worked with  
Your supervisor, staff, (mandatory) colleagues, (family if you like)

Third page

**I Summary with results – No Abstract!**

please short! Recommendation: one page, but not more than three pages ( this Summary you will write when the whole thesis is finished!)

Fourth page:

- **List of Content**

## Thesis: Organization of the Chapters (III)

### I Summary - Take care: a roman one “ I „!

You choose an **roman number** because of the differentiation to the rest of the thesis where the chapters, table and figures are specified by arabic numbers.

This chapter only gives the facts, very briefly!

Recommendation: -

**You should write this chapter when the rest of thesis is done! Then it will be as short as possible and all content and structure is clear and defined. So you will not have to change anything afterwards.**

**This chapter is even placed before the list of content. It should inform about the main points so that the reader can decide whether he/she is interested to read the whole thesis.**

Fifth page:

1. Introduction: content: Literature Review, development of the topic    what is already known, developed? You will set up the starting    point of your research!
2. Problem
3. Objectives
4. Experiments or Experimental:  
You briefly describe in a technical manner, what kind of experiments you have done, receipes,    procedures. You give all details about the equipments, producer, company, age of the machine
5.    And so on:    Chapters about your topic! You determine the headlines!

# Thesis      Organization of the Chapters (V)

- x. Results
- x. (or Results and) Discussions – can be one chapter as well! What are your results? What is your opinion? Are you able to solve the problem, to reach the target? What is the experience of other researchers you found in the literature? Compare, discuss, evaluate!
- x. Conclusion: a detailed summary including information what other researchers have found. It proves your results or there is an contradiction as discussed in the chapter Discussion?
- x. Outlook (what should be done in the future? To be investigated by you or other researchers?)
- x. References

x. Glossary or List of Abbreviations

x. List of Tables

x. List of Figures

x. Appendix

(think about a separate list of content and structure the various files)

**Affidavit,**

**signed by you - after the print in each copy before submission to the exam office!**

## Introduction (I)

This chapter can contain the chapter problems and objectives, as well. Your supervisor will tell what he/she prefers: each content in a separate chapter or the three combined in the chapter Introduction.

Nevertheless the structure and contents of the chapters Problems, Objectives and Introduction have to be present. In case of the implementation of all chapters in the chapter Introduction you have to change the numbering respectively the organization of the chapters, for instance

### 1. Introduction

#### 1.1 Problem

#### 1.2 Objectives

### 2. Experiments or Experimental or Methods (what you prefer..)

**There do not exist rules. Only proposals are shown.**



## Introduction (II)

Any way, you start with the introduction into the topic. Write clear and easy.

Give the literature review. What means, give the state of the art knowledge of your topic. You compare the findings of other scientists related to the frame of your chosen topic, assess their information and lead to your thesis topic, your problem/challenges and the objectives.

You set up a frame, a platform, a starting point for your thesis, paper etc. .

Work out the state-of-the-art of your topic and the direction where to go to with your investigations. Where is the gap which you like to close by your scientific research?

Take care, keep a the central theme from start to the end, choose a starting point of your discussion.

## Introduction (III)

### Keep in mind:

you will read a lot of books and papers to get an overview about the topic. But in the chapter “Introduction“ you will describe the state of the art by help of the literature (so called literature review), you detected, in a strategic manner! You will only mention and describe those contents based on papers, articles which are relevant for your core topic. Target of quotation of papers (literature) is to introduce into the topic, to show where are problems, open questions, what has not been solved up to now. You construct the „platform“ or the background for your further discussions by the literature you mention.

**A high sophisticated duty to find the right literature and then choose the suitable and the best ones for your literature review and discussion!**

The chapter so called  
**Reference or Reference List or Literature**

will only contain a list of the literature mentioned and discussed in the chapter „Introduction“ (or in general all over the thesis/of for the presentation/ for the poster and so on) what means

the books, papers and so on you have chosen for writing the specific scientific paper.

This list has to be organized in the right bibliographic way, author´s name , title and so on (see the sheet Reference List).

The citation style might be different in dependance of your supervisor´s preference or the journal paper´s guideline and so on.

I have chosen MLA style for the workshops.

Do you understand the difference of literature review and reference list?

# How to give the literature, the bibliographical reference within the chapter introduction and in the list of reference?

- First name, family name, book title, chapter (maybe the author of the chapter, interval of the pages) book publisher, city and year
- or first name, family name, title of the article, name of the journal, year in brackets, volume in bold or underlined, intervall of pages,
- or first name, family name, title of the paper, of the talk, conference name, year
- Website, day of the last check will be helpful, but not mandatory any more
- Personal communication, with whom, where and when
- Usually, the literature in the text is given by a number. The reference list is then organized in the similar way. Some supervisors prefer no number and instead of number the author's family name in brackets. In this case the reference list is given in the alphabetic sequence.

## Introduction (IV)

### Layout: Avoid to fill up the pages! Compare!

**NO!** Wrong!

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**Yes!** Right!

To support the reader's concentration while reading

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Subdivide your text in smaller subsections!

## Introduction (IV)

## Layout: the right distance to the edges of the page!

**Yes!** To support the reader's concentration while reading

A margin of at least 2,5 cm shall be left on the left-hand side; at the top and bottom of each sheet of paper as well.

The number of the page

A margin of at least 2,0 or 2,5 cm shall be left on the right-hand side;

[illegible]

## Subdivide your text in smaller subsections!

## Introduction (V)

### How to present a table?

**Table 1: The development of the weather in 2019**

Date	Rain	Sun	Temperature
2016	[ml/m <sup>2</sup> ]	[ h ]	[°C]

**Description of the table content please **above the table**. The table itself, the information given have to be described in the chapter text. Add the reference if the table is not produced by yourself!**

### How to present a figure/or photo?



**Figure 1: The Weather in Düsseldorf (source)**

Figures, photos, description **below** the figure! But do not forget to discuss the figure's information in your chapter! Add the source number if necessary!

## How to handle the quotation of literature? (I)

If you will summarize the statement or conclusion of an scientist with your own words then you only have to give the reference number.

For instance,

xxxxxxxxxxx (12) . This means that the number refers to the text mentioned in this single sentence.

If you will set the number after the dot, the reference is refers to the whole chapter:

XXX  
XXX  
XXX. (12)

If you mention some scientist's findings word by word, then you are forced to set this sentence (s) , this quotation in inverted comma and give the reference number like described above.



## How to handle the quotation of literature? (II)

If you like to mention verbatim some scientist's findings, then you are forced to set this sentence(s) , this quotation in inverted comma and give the reference number like described above.

„XXXXXXXXXXXXXXXXXXXXXXXXXXXX „ (12)

Please do not make use of word-for-word quotation so often. From the quality point of view, it is more complicated to summarize the scientist's article or statement and give it in your own word. So the quality level will be rated in a better, in a higher manner.

Additional Information for the Chapter:

## **Problems:**

this chapter will give the information about an open question you have created or detected. This forms the motivation for your research!

For instance: earthquake.....

Many people are killed because of the construction of their houses or public buildings is not earthquake-proof. In dependance of the intensity of the

Or .....because no early warning systems are developed yet.

Or or....

Additional information for the Chapter:

## **Objectives:**

Here you give the objectives you like to find out because of the research done during your thesis or your research.

You should have an idea from the very beginning of your research where to go to, what you like to achieve, to find out. Set up your hypothesis!

But during your investigations it might happen that you have to change your objectives because you realize that the methods you have chosen at the beginning of your research are not the appropriate ones. Then you have to give reasons.

In any case it is wise to finalise this chapter at the end of your thesis when the procedures are clear.

**Experiments or Construction or...Materials and Methods - what you choose will depend on the topic and direction.... your supervisor..**

Give a short introduction to each chapter in order to guarantee the understanding, the central theme. But this is a very technical chapter.

Here you have to give the technical details, machines of the experiments including the manufacturer and year, construction, software, etc. etc., tests etc. you do.

Or you have to list the methods, the methodology of your research in dependance of your topic or the area of the research.

You have to mention everything, so that your research project can be understood and transfered into a product, for instance.

Write clear, write in order to make the conversion possible!

## Results

Or better you combine **Results and Discussion in one chapter!**

Some introduction to the chapter, central theme! Don't mind for repetition!

The results should be given in accordance to the chapter **Experiments** similar to a list, including tables, figures, statistics.

If you combine both, results and discussion, then you follow the central theme, give the results and compare with findings in literature with yours, evaluate and point out the importance for your topic.

The chapter **Results and Discussion** is the most important one to point out your engineering competence, your capability to evaluate, to compare the literature findings (you already mentioned in your introduction) and your own ones!

**This chapter should have a volume according to its importance!**

## Results and Discussion

Use statistical methods in order to prove results, to make decisions based on statistics!

Verify your hypothesis if you are able to do so!

Support the interpretation by pictures, by technical drawings etc. etc..  
Transfer tables to figures to show your findings and to facilitate their interpretation!

Convince the reader by choosing the right design and arguments. Choose the suitable strategy for your target group!

These are scientific tools, but anyway all together you have to complete your own marketing!

**Follow the law: no plagiarism, no fake, be honest, differentiate and point out your findings and the findings of other experts!**

# Conclusion

The conclusion will summarize the whole thesis!

Repetitions are allowed. They should not be avoided. They are necessary in order to point out the story and to help the reader to understand. **The keyword: central theme**

You summarize important parts of the introduction, problem, objectives, experimental, results and discussion. You evaluate the idea, the research, the findings.

## Outlook

The results of your research have consequences for further research, for new products, machines... what ever. All aspects will be finalised by your thesis? What should be the next step? What will be the benefit of your thesis? The world will be changed?

Further investigations of some special points are necessary? They are of interest? Why?

The start of the transfer into economy, into business, in new products.. could be one important part.



## Glossary or List of Abbreviations

This is an important chapter and you should list the abbreviations with care, maybe in columns! If there are many, choose an alphabetical list.

### List of Tables, List of Figures:

some supervisors prefer that you offer these chapters. Do it with care.

All tables and all figures have to be numbered. Separate ones for each category! As well each table has to have a description, which is mentioned on the top of the table. Number of the table, the description text and the chapter and page, where the reader can find it, have to be listed in this list of tables. The same rules who have to apply to the list of figures.

**For all tables and figures: You have to add the source by a number according to the number in the reference list to each table (above the table) or to each figure (below the figure after the description) in your paper which you have copied out of a source!** If you will published your paper you have to ask the author for permission to make use of his or her figure or table.

# Appendix

Here you can give additional results, technical details which are important and basics of the research of your thesis. But these details are too many, too extensive. Maybe these details are background information from the strategical point of view.

In any case: you like to mention it, but the content would be too much for the core thesis.

The chapters of the Appendix receive special numbers which should be different to the thesis itself.

Option: Maybe you use capital letters instead of numbers for the Appendix structure! Arabic and roman numbers you used in your thesis already and so their use should be avoided here.

## Declaration

I, **First Name Name**, declare that the research work presented here is from the best of my knowledge and belief, original and the result of my own investigations. The cooperation I got for this research work is clearly acknowledged. To the best of my knowledge, it does not contain any materials those are written by others or published already except mentioned with due references in the text as well as with the quotation marks.

This work has not been published, submitted, either in part or whole intended for reward, degree at this or any other University.

*Kleve, **Date***

***Signature***

Source: <https://sharepoint.hochschule-rhein-waal.de/sites/QMPortal/SitePages/Homepage.aspx>, Prof. Simon

# Affidavit¶

I affirm that this Master Thesis entitled [insert title here] was written by me without any unauthorized third-party support. All used references and resources are clearly indicated. All quotes and citations are properly referenced. This Master Thesis was never presented in the past in the same or similar form to any examination board. I agree that this document may be subject to electronic plagiarism check. For this purpose, an anonymous copy may be distributed and uploaded to servers within and outside the Rhine-Waal University of Applied Sciences.¶

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Kleve, [Date of submission]¤

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(Signature)¤

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¶ ..... Abschnittswechsel (Nächste Seite) .....

Exchange Master to Bachelor thesis!!!

Sign each copy after the print! It must be an original signature.

**Questions??**

**Good luck!**